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ABSTRACT OF THE DISCLOSURE

A process for producing a semiconductor substrate is provided which comprises steps of forming a porous layer on a first substrate, forming a nonporous monocrystalline semiconductor layer on the porous layer of the first substrate, bonding the nonporous monocrystalline layer onto a second substrate, separating the bonded substrates at the porous layer, removing the porous layer on the second substrate, and removing the porous layer constituting the first substrate.

A method is provided for producing, with high reproducibility, an SOI substrate which is flat and high in quality, and simultaneously for achieving resources saving and reduction in cost through recycling of a substrate member. For accomplishing this, a porous-forming step is performed forming a porous Si layer on at least a surface of an Si substrate and a large porosity layer forming step is performed for forming a large porosity layer in the porous Si layer. This large porosity layer forming step is performed by implanting ions into the porous Si layer with a given projection range or by changing current density of anodization in said porous-forming step. At this time, a non-porous single-crystal Si layer is epitaxial-grown on the porous Si layer. Thereafter, the surface of the porous Si layer and a support substrate are bonded together, and then separation is performed at the porous Si layer with the large porosity. Subsequently, selective etching is performed to remove the porous Si layer.

SOI substrates are fabricated with sufficient quality and with good reproducibility. At the same time, saving of resources and reduction of cost are realized by reuse of wafer and the like.

Carried out to achieve the above are a step of bonding a principal surface of a first substrate to a principal surface of a second substrate, the first substrate being an Si substrate in which at least one layer of non-porous thin film is formed through a porous Si layer, a step of exposing the porous Si layer in a side surface of a bonding substrate comprised of the first substrate and the second substrate, a step of dividing the porous Si layer by oxidizing the bonding substrate, and a step of removing porous Si and oxidized porous Si layer on the second substrate separated by the division of the porous Si layer.